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CODE CREATORS
SHEFFIELD

2024 PYTHON BEGINNER COURSE

Lesson 0

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Introduction

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- Introduce Enactus
- Social Media
- Why learn Python
- IDE selection
- VS Code Installation
- Python Installation
- Introduce Terminal

Thank you

University Life is busy.
We appreciate you spent your time wisely with us.
We hope you get the most out of this course.

By signing up for the course:

- You joined the community
- You get constant support from many other our experienced mentors
- You have help funded our social enterprises

- OnTarget
- CARTE
- Vape Drop

OnTarget

CARTE

VAPE DROP

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Meet The Team

Rikzar
Project Manager

Rokas
Outreach

Julian
Project Manager

Amin
Financial

Izenith
Project Manager

Shalev
Program Developer

Nedjm
Program Developer

Haris
Mentor

Jivanthika
Mentor

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Follow Our Social

Instagram
@code_creators

- Keep you updated
- quick DM reply with queries relating to finance
- See what goes on at CC

Discord Server
discord.gg/DX3S8EURz2

- Support from CC Mentors
- Private community for CodeCreators members

GitHub Resource
@ccsheff24

- Starter project files are here.
- Contribute to open source.

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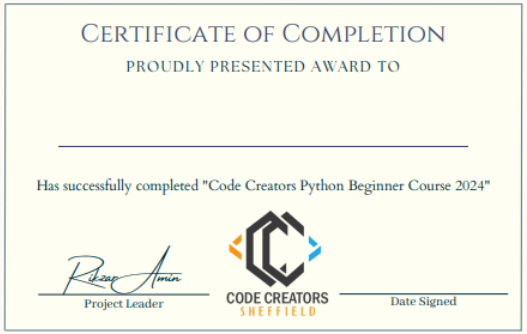
Recognising your effort

After you have completed our final project, you will be awarded with a digital website friendly version of certificate of completion tailored for you to upload on LinkedIn profile or your own CV.



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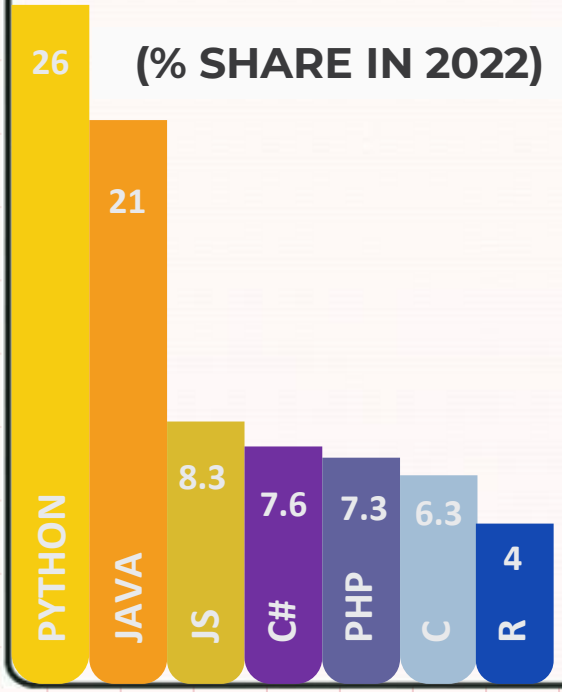
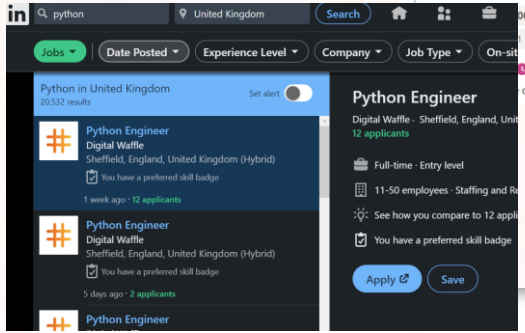
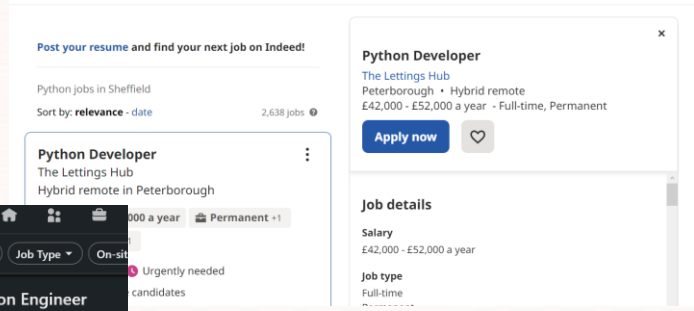
Why learn Python: EVERGROWING POPULARITY

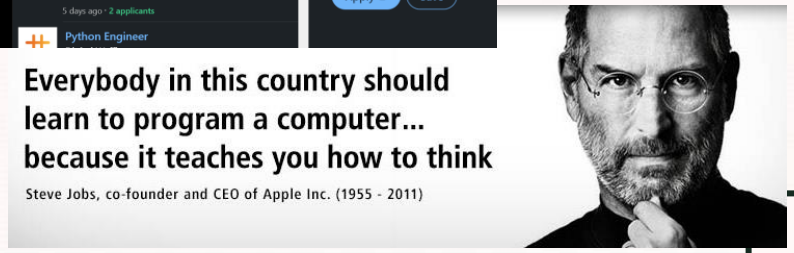


(% SHARE IN 2022)





You won't be short of employment after learning Python!



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Why learn Python: BEGINNER FRIENDLY

Python provides simple syntax to write your code. This is thanks to its indentation style, lack of triviality like terminating semi-colons or type definitions and a rich in-built standard library. Less time for errors, more time for coding!

PYTHON

```python
# no import needed
print("Code Creators!")
```

C

```c
#include <iostream>
using namespace std;
int main(int argc, char * argv[])
{
    cout << "Hello, world!" << endl;
    return 0;
}
```

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Why learn Python: RANGE OF APPLICATIONS

Web Dev
(Covered in the advanced course.)

- Make websites using frameworks like Django.
- Ability to handle asynchronous requests.

Machine Learning

- Plenty of libraries for ML like Keras, TensorFlow, and Scikit-learn for machine learning.
- Python acts an easier interface compared to Java etc.
- Python performs slower than C. Under the hood these libraries run on C anyway so it doesn't matter.

Big Data Analysis

- In-built features of supporting data processing for unstructured and unconventional data which is a common need in big data.
- Libraries like Pandas and SciPy aid with analysing data.

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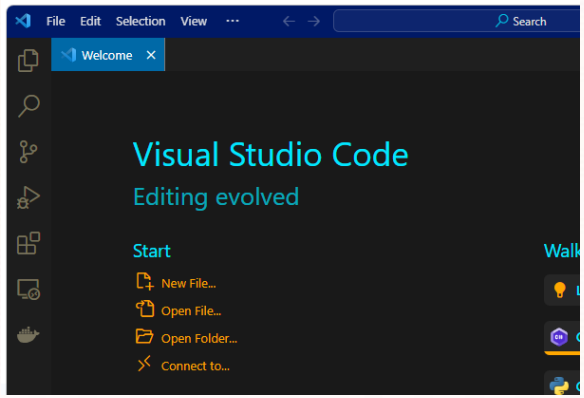
Code editor / IDE setup

Throughout the rest of the course, we will use Visual Studio Code. However, you are free to use any code editor or Python IDE you want.

Recommended:

- PyCharm
- VScode
- Thonny
- Atom
- IDLE (This comes with the express Python installation so no further setup is required. Simply search for "IDLE" in your start menu.)



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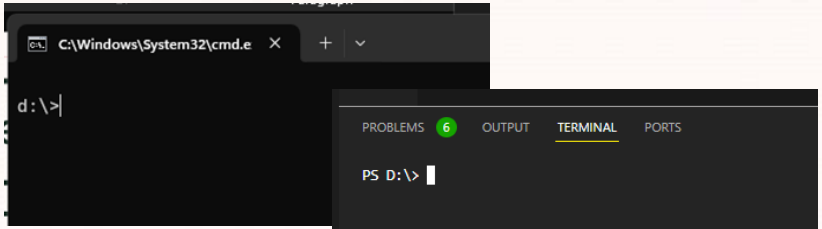
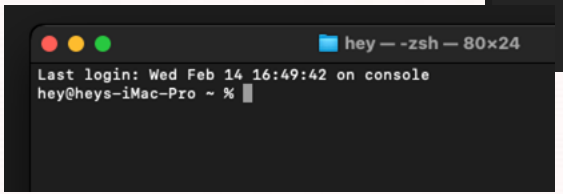
Terminal

A window where user interact with the operating system
A text-based console application by entering text input through the computer keyboard and reading text output from the computer terminal.

Windows console is called the command prompt window & accepts MS-DOS commands.



macOS terminal accepts zsh commands, similar to sh command in Linux.



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Python Installation

For Windows:

```
winget install -e -i --id=Python.Python.3.11 --source=winget --scope=machine
```

For macOS:

1. Open the Terminal app and install brew
   `/bin/bash -c "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/HEAD/install.sh)"`
2. Install python with: `brew install python`
3. Type `nano ~/.bash_profile` and press Enter.
4. Add the following line to the file:
   `export PATH="$PATH:/Library/Frameworks/Python.framework/Versions/X.Y/bin"`
5. Save the file by pressing Ctrl+O, then press Enter.
6. Close the file by pressing Ctrl+X.
7. Restart the Terminal app for the changes to take effect.

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VS Code Installation and Extension Setup

For Windows:

```
winget install Microsoft.VisualStudioCode --override '/SILENT
/mergetasks="!runcode,addcontextmenufiles,addcontextmenufolders"'
```

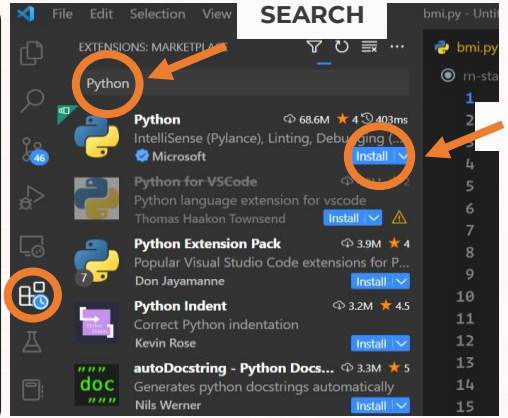
For macOS:

```
brew install --cask visual-studio-code
```

After Installation:

Click on the building blocks icon and search "Python" in the search bar and install the first extension that comes up. This gives us features like below and more. Feel free to add any other extension which you may find useful.

- IntelliSense (Pylance)
- Linting
- Debugging
- Code formatting



Course material download : GitHub Resource

For Windows:

```
cd %homepath%/Downloads
winget install --id Git.Git -e --source winget
```

For macOS:

```
cd ~/Downloads
```

1. Install Git with: `brew install git`

or

1. Install Xcode from AppStore (include Basic Git)

After Installation:

```
git clone <url>
```

For this week:

```
git clone https://github.com/ccsheff24/week1
```

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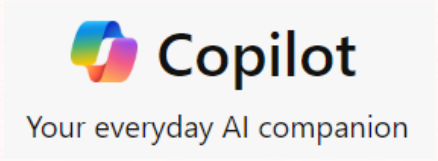
Generative AI

Since the release of ChatGPT in November 2022, Generative AI has been optimized for generating code snippet and debug.

You are welcome to use Generative AI to encounter any coding problem. My advice is use it as your last resort as fixing errors trains your problem-solving skills. Also, you are welcome to ask our mentors on discord support channel

Some popular free Generative AI are:

- OpenAI's ChatGPT
- Google's Gemini
- Microsoft Copilot



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Lesson 1

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Python Basics

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- Data Types
- Arithmetic operations
- Variable & constant
- Identifier
- Type Casting
- Input/ Output
- Week 1 Project : BMI

Data Types

Data types define a possible set of values and what operations can be done on them. Typically languages have primitives (basic data types from which all other data types are constructed).

In the case of Python every value is an object but don't confuse this for an object type.

Data Types	Python Classes	Example	Description
Numeric	int, float, complex	20, 20.5,2+5j	holds numeric values
String	str	"apple"	holds sequence of characters
Sequence	list, tuple, range	["apple", "banana"] ("apple", "banana")	holds collection of items
Mapping	dict	{"name" : "John", "age" : 36}	holds data in key-value pair form
Boolean	bool	True, False	holds either True or False
Set	set, frozeenset	{"apple", "banana"}	hold collection of unique items
Binary	bytes, bytearray, memoryview	b"Hello"	Hold binary (non-printable) data

```
number = 20
fruit = "pear"
print(type(fruit))
# type <class'string'>
```

Arithmetic operations

Python follows the traditional mathematical operations and rules of precedence (BIDMAS).

Operator	Operation	Example
+	Addition	`4 + 2 = 6`
-	Subtraction	`5 - 3 = 2`
*	Multiplication	`4 * 2 = 8`
**	Exponent	`4 ** 2 = 16`
/	Division	`7 / 2 = 3.5`
//	Floor (or Integer) division	`7 / 2 = 3` `# 3.5 rounds to 3`
%	Modulus	`7 % 5 = 2`

If you ever need to do an operation on an existing variable you can put the operator in front of the assignment syntax.

```
x = 20
x = x / 2
print(x) #10
```

=

```
x = 20
x /= 2
print(x) #10
```

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Variable

Variables work like they in maths, they store some value in memory.

What we just wrote is known by 3 names which are used interchangeably but incorrectly. Only one of them is technically correct in the context of Python.

- ~~Variable **declaration** – Declaration just specifies the type but doesn't allocate memory.~~
- ~~Variable **definition** – Definition associates the variable with a type and allocates memory.~~
- Variable **assignment** – The name on the left-hand side now refers to the result of evaluating the right-hand side, regardless of what it referred to before (if anything)

The name given to the variable is called Identifier

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Python Identifier

The name that given to a variable and function are named as identifier

There are special rules:

- They cant be python keywords (True, False, None, print)
- They are case-sensitive (Animal & animal are different variable
- Whitespace is not allow (calculated answer ➔ calculated_answer)
- Cannot use special symbol (e.g. !, @, #, $)
- Begin with letter or _ .Cannot start with digit (~~1name~~)

👍 **Good**

Name
is_complete
num_of_people

👺 **Bad**

lMAao!

😱

1st_variable

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Type Casting

Unlike other languages like JavaScript, Python prefer *explicit is better than implicit.* That means Python won't automatically type casting.

We also have to (explicitly) convert types so that they're compatible with each other.

```
num1 = int("5")
num2 = int(-2.8)
num3 = float("5")

print(num1) # prints 5
print(num2) # prints -2
print(num3) # prints 5.0
```

```
print("It's " + 11 + "AM")
# TypeError: can only concatenate str (not "int") to str
print("It's " + str(11) + "AM")
# It's 11 AM
```

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Python I/O

We can use `print` keyword to output to terminal and get user input using `input` to assign a variable

`print` statement will automatically create a newline. To avoid this, we can add an argument `end = ''` before the closing bracket

`input` statement pauses execution of the program until Enter key is pressed. It takes 1 optional argument for the prompt

```
print("Is GTA", 6, "released?", False)
# Is GTA 6 released? False


print("hello", end = '')
print("world")
# helloworld
#
```

```
name = input("Enter your name: ")
print(name)
# Enter your name: James
# James
```

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Format String

Sometime, we don't want to spamming `,` or `+` while printing

`.format` is method available on all strings using the do notation. If you specify index numbers, they'll correspond with the ordered value you supplied in the method. Or you can use keyword arguments. Otherwise, they'll follow consecutive order.
OR
you use the format specifiers and the `%` operator. THIS IS NOT THE SAME AS THE MODULUS OPERATOR YOU WILL LEARN LATER. The format specifiers must be in order with the argument list and must match the same data type
`%s` string `%f` float `%i` integer
OR
`f"string{variable}string"` you can embed variables and expressions directly in f-strings.

```
print('{2} {0} {1}'.format('are in',
'order', 'We')) # We are in order


print("pham %s worked %2.1f hours on
this %s around" % ('walked', 48.23,
'lecture'))

last_name = False || "Obama"
print(f"Obama's last name is
{last_name}.")
```

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Comment

You might notice hash(#) symbol in the previous example. In python, it is for writing a single-line comment.

Comment can be used to
- Explain code
- Make code more readable
- Prevent execution when testing

You can also write multiline comment by (""""). This usually appear at the front

```
"""
Written on 2024
Version 1.0
"""
fruit = "apple"
# assignment used
```

Shortcut key for most text editor:
Ctrl + / if you are on Windows
Cmd + / if you are on a Mac.

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Week 1 Project: BMI calculator

BMI is a way to figure out your approximate level of body fat in an easy, inexpensive way.

Requirement:

- user able to input height (in centimeters)
- user able to input the weight (in kg)
- user able to see the BMI index
- BMI index output with any string formatting

BODY MASS INDEX FORMULA (Metric)

$$BMI = \frac{\text{Weight (kgs)}}{[\text{Height (m)}]^2}$$

```
# Final Result:
BMI Calculator

Enter your height in cm: 180
Enter your weight in kg: 75
Your BMI is: 23.148148148148145
```

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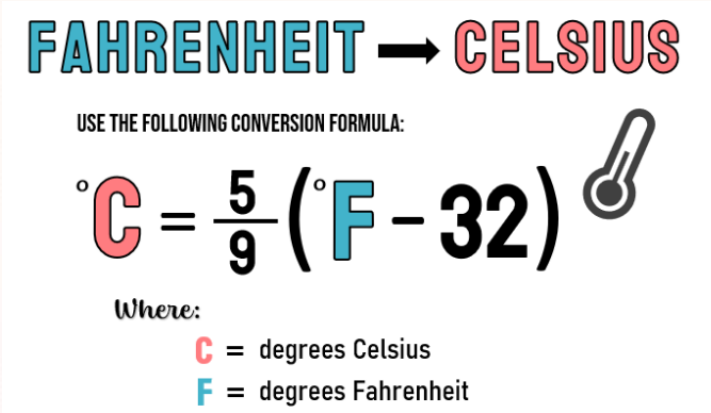
Week 1 Project: Advanced project




```
# Final Result:
Temperator Convertor

Enter temperature in F: 59
Current temperature in C: 15
```

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